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Recent range expansion and population genetics of the Argentine ant
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The Argentine ant, *Linepithema humile*, has successfully spread from its native range in South America across much of the globe. A form of social structure, supercoloniality, whereby individuals from separate nests cooperate, is attributed to its successful worldwide expansion. The Argentine ant, first noted in 1993, is now found in several regions of Japan. Here, we used mitochondrial DNA to examine the genetic structure of introduced *L. humile* populations in Japan and how they relate to other introduced and native populations to understand the species' invasion history in Japan. Sequencing revealed six haplotypes distributed across its introduced ranges, of which five were present in Japan. One supercolony that extends across Europe, North America, Australasia, and Japan comprises the dominant supercolony (i.e., the largest colony) recorded on each continent or island where it is found. Whereas several minor supercolonies with different haplotypes are locally distributed within their introduced ranges. We also examined the potential gene flow among the four adjacent supercolonies to improve our understanding of the mechanism of supercolony formation. Our behavioral assay revealed that the workers did not show strong aggressiveness toward foreign males early in the reproductive season, suggesting the possibility of male-mediated gene flow. However, genetic analyses using microsatellite markers revealed significant genetic differentiation and restricted gene flow among the supercolonies. Each supercolony is therefore likely to function as a reproductive unit, from an evolutionary perspective. We also found that workers from two supercolonies with broad distributions tended to be more aggressive than the other colonies toward foreign males. If these two supercolonies are both more aggressive and superior competitors, then restricted gene flow among the supercolonies may be responsible for the maintenance of specific behavioral traits that help these supercolonies expand into new habitats, resulting in successful worldwide expansion of *L. humile*.